We claim:

1. A method for monitoring the injection of fluid into a subterranean formation, comprising the steps of:

injecting a fluid into a region of the subterranean formation surrounding a well bore;

creating frequency spectrum data by applying a wavelet transform to physical property data sensed in the subterranean formation during the time in which fluid is injected into the formation; and

determining from the frequency spectrum data at least one parameter relating to the fluid injection.

2. The method of claim 1 wherein the physical property data is selected from the group consisting of pressure data and temperature data.

3. The method of claim 1 wherein all steps are performed in real time.

4. The method of claim 1 further comprising performing a remediative step.

5. The method of claim 4 wherein the remediative step is selected from the group consisting of discontinuing the injection of the fluid into the well bore; injecting a different fluid into the well bore; pressure pulsing the injection of the fluid into the well bore; halting the injection of a proppant into the well bore; injecting a different proppant into the well bore; injecting a clear fluid into the well bore, then resuming the injection of proppant into the well bore; reducing the injection pressure of the fluid injected into the formation; and altering the viscosity of the fluid injected into the formation.

6. The method of claim 1 wherein the step of injecting a fluid comprises injecting a fluid into a region of the subterranean formation surrounding a well bore so as to create or extend at least one fracture in a subterranean formation.

7. The method of claim 6 wherein the step of determining at least one parameter comprises making a determination selected from the group consisting of: determining that the fracture is being extended by the injection of the fluid; determining that a spurious event has occurred; determining that a formation event has occurred; determining the type of formation event that has occurred; determining whether a remediative step is necessary; and determining whether a remediative step that has been performed was successful.

8. The method of claim 6 wherein the step of determining at least one parameter comprises determining that a formation event has occurred, comprising making a determination selected from the group consisting of: determining that the fracture has ceased to extend and determining that the fracture has closed.

9. The method of claim 7 wherein the step of determining at least one parameter further comprises the step of utilizing a log-log plot of a net pressure curve.

10. The method of claim 7 further comprising the additional step of performing a remediative step.

11. The method of claim 10 wherein the remediative step is selected from the group consisting of discontinuing the injection of the fluid into the well bore; injecting a different fluid into the well bore; pressure pulsing the injection of the fluid into the well bore; halting the injection of a proppant into the well bore; injecting a different proppant into the well bore; injecting a clear fluid into the well bore, then resuming the injection of proppant into the well bore; reducing the injection pressure of the fluid injected into the formation; and altering the viscosity of the fluid injected into the formation.

12. The method of claim 10 wherein all steps are performed in real time.

13. The method of claim 1 wherein the step of injecting a fluid comprises injecting a fluid into a region of the subterranean formation surrounding a well bore so as to maintain or increase the pressure in the formation.

14. The method of claim 13 wherein the fluid is selected from the group consisting of water and carbon dioxide.

15. The method of claim 13 wherein the step of determining at least one parameter comprises making a determination selected from the group consisting of: determining that the fluid injection is proceeding effectively; determining that a spurious event has occurred; determining that a formation event has occurred; determining the type of formation event that has occurred; determining whether a remediative step is necessary; and determining whether a remediative step that has been performed was successful.

16. The method of claim 13 wherein the step of determining at least one parameter comprises determining that a formation event has occurred and determining the type of formation event that has occurred, wherein the step of determining the type of formation event that has occurred comprises the step of making a determination selected from the group

consisting of: determining that the fluid has reached a boundary within the formation, and determining that the fluid has departed from the zone of interest within the formation.

17. The method of claim 14 further comprising the additional step of performing a remediative step.

18. The method of claim 17 wherein the remediative step is selected from the group consisting of discontinuing the injection of the fluid into the well bore; injecting a different fluid into the well bore; pressure pulsing the injection of the fluid into the well bore; reducing the injection pressure of the fluid injected into the formation; and altering the viscosity of the fluid injected into the formation.

19. The method of claim 18 wherein all steps are performed in real time.

20. The method of claim 1 wherein the step of injecting a fluid comprises injecting a first fluid into a region of the subterranean formation surrounding a well bore so as to alter the flow profile of a second fluid within the subterranean formation.

21. The method of claim 20 wherein the step of determining at least one parameter comprises making a determination selected from the group consisting of: determining that the injection of the first fluid is proceeding effectively; determining that a spurious event has occurred; determining that a formation event has occurred; determining the type of formation event that has occurred; determining whether a remediative step is necessary; and determining whether a remediative step that has been performed was successful.

22. The method of claim 20 wherein the step of determining at least one parameter comprises determining that a formation event has occurred and determining the type of formation event that has occurred, wherein the step of determining the type of formation event that has occurred comprises the step of making a determination selected from the group consisting of: determining that the first fluid has reached a boundary within the formation, and determining that the first fluid has departed from the zone of interest within the formation.

23. The method of claim 21 further comprising the additional step of performing a remediative step.

24. The method of claim 23 wherein the remediative step is selected from the group consisting of discontinuing the injection of the fluid into the well bore; injecting a different fluid into the well bore; pressure pulsing the injection of the fluid into the well bore; reducing the

injection pressure of the fluid injected into the formation; and altering the viscosity of the fluid injected into the formation.

25. The method of claim 23 wherein all steps are performed in real time.

26. The method of claim 1 wherein the step of creating frequency spectrum data comprises applying a wavelet from the Daubechies family of wavelets.

27. A computer-implemented method for monitoring the injection of fluid into a subterranean formation, comprising the steps of:

receiving in a computer physical property data obtained from the injection of a fluid into a region of a subterranean formation surrounding a well bore;

performing in the computer a Wavelet Transform on at least a portion of the physical property data received in the computer to provide frequency spectrum data corresponding to at least a portion of the physical property data; and

using the frequency spectrum data to determine at least one parameter relating to the fluid injection process.

28. The method of claim 27 wherein the physical property data is selected from the group consisting of pressure data and temperature data.

29. The method of claim 27 wherein all steps are performed in real time.

30. The method of claim 27 further comprising the additional step of performing a remediative step.

31. The method of claim 30 wherein the remediative step is selected from the group consisting of: discontinuing the injection of a fracturing fluid into a well bore; injecting a different fluid into a well bore; pressure pulsing the injection of a fluid into a well bore; halting the injection of a proppant into a well bore; injecting a different proppant into a well bore; injecting a clear fluid into a well bore, then resuming the injection of proppant into the well bore; reducing the injection pressure of a fluid injected into the formation; and altering the viscosity of a fluid injected into the formation.

32. The method of claim 30 further comprising the additional step of transmitting an output from the computer to perform the remediative step.

33. The method of claim 27 wherein the step of injecting a fluid comprises injecting a fluid into a region of the subterranean formation surrounding a well bore so as to create or extend at least one fracture in a subterranean formation.

34. The method of claim 33 wherein the step of determining at least one parameter comprises making a determination selected from the group consisting of: determining that the fracture is being extended by the injection of the fluid; determining that a spurious event has occurred; determining that a formation event has occurred; determining the type of formation

event that has occurred; determining whether a remediative step is necessary; and determining whether a remediative step that has been performed was successful.

35. The method of claim 33 wherein the step of determining at least one parameter comprises determining that a formation event has occurred, comprising making a determination selected from the group consisting of: determining that the fracture has ceased to extend and determining that the fracture has closed.

36. The method of claim 34 wherein the step of determining at least one parameter further comprises the step of utilizing a log-log plot of a net pressure curve.

37. The method of claim 34 further comprising the additional step of performing a remediative step.

38. The method of claim 37 wherein the remediative step is selected from the group consisting of: discontinuing the injection of a fracturing fluid into a well bore; injecting a different fluid into a well bore; pressure pulsing the injection of a fluid into a well bore; halting the injection of a proppant into a well bore; injecting a different proppant into a well bore; injecting a clear fluid into a well bore, then resuming the injection of proppant into the well bore; reducing the injection pressure of a fluid injected into the formation; and altering the viscosity of a fluid injected into the formation.

39. The method of claim 38, further comprising the step of using an expert computer program to analyze the frequency spectrum data, and wherein the remediative step is suggested by the expert computer program.

40. The method of claim 37 wherein all steps are performed in real time.

41. The method of claim 37 further comprising the additional step of transmitting an output from the computer to perform the remediative step.

42. The method of claim 27 wherein the step of injecting a fluid comprises injecting a fluid into a region of the subterranean formation surrounding a well bore so as to maintain or increase the pressure in the formation.

43. The method of claim 42 wherein the fluid is selected from the group consisting of water and carbon dioxide.

44. The method of claim 42 wherein the step of using the frequency spectrum data to determine at least one parameter comprises making a determination selected from the group consisting of: determining that the fluid injection is proceeding effectively; determining that a

spurious event has occurred; determining that a formation event has occurred; determining the type of formation event that has occurred; determining whether a remediative step is necessary; and determining whether a remediative step that has been performed was successful.

45. The method of claim 42 wherein the step of determining at least one parameter comprises determining that a formation event has occurred and determining the type of formation event that has occurred, wherein the step of determining the type of formation event that has occurred comprises the step of making a determination selected from the group consisting of: determining that the fluid has reached a boundary within the formation, and determining that the fluid has departed from the zone of interest within the formation.

46. The method of claim 43 further comprising the additional step of performing a remediative step.

47. The method of claim 46 wherein the remediative step is selected from the group consisting of: discontinuing the injection of a fracturing fluid into a well bore; injecting a different fluid into a well bore; pressure pulsing the injection of a fluid into a well bore; reducing the injection pressure of a fluid injected into the formation; and altering the viscosity of a fluid injected into the formation.

48. The method of claim 47, further comprising the step of using an expert computer system to analyze the frequency data, and wherein the remediative step is suggested by the expert computer system.

49. The method of claim 46 wherein all steps are performed in real time.

50. The method of claim 46 further comprising the additional step of transmitting an output from the computer to perform the remediative step.

51. The method of claim 27 wherein the step of injecting a fluid comprises injecting a first fluid into a region of the subterranean formation surrounding a well bore so as to alter the flow profile of a second fluid within the subterranean formation.

52. The method of claim 51 wherein the step of using the frequency spectrum data to determine at least one parameter comprises making a determination selected from the group consisting of: determining that the injection of the first fluid is proceeding effectively; determining that a spurious event has occurred; determining that a formation event has occurred; determining the type of formation event that has occurred; determining whether a remediative

step is necessary; and determining whether a remediative step that has been performed was successful.

53. The method of claim 51 wherein the step of determining at least one parameter comprises determining that a formation event has occurred and determining the type of formation event that has occurred, wherein the step of determining the type of formation event that has occurred comprises the step of making a determination selected from the group consisting of: determining that the first fluid has reached a boundary within the formation, and determining that the first fluid has departed from the zone of interest within the formation.

54. The method of claim 52 further comprising the additional step of performing a remediative step.

55. The method of claim 54 wherein the remediative step is selected from the group consisting of: discontinuing the injection of a fracturing fluid into a well bore; injecting a different fluid into a well bore; pressure pulsing the injection of a fluid into a well bore; reducing the injection pressure of a fluid injected into the formation; and altering the viscosity of a fluid injected into the formation.

56. The method of claim 55 further comprising the step of using an expert computer program to analyze the frequency data, and wherein the remediative step is suggested by the expert computer program.

57. The method of claim 54 wherein all steps are performed in real time.

58. The method of claim 54 further comprising the additional step of transmitting an output from the computer to perform the remediative step.

59. The method of claim 27 wherein the step of performing in the computer a wavelet transform comprises applying a wavelet from the Daubechies family of wavelets.

60. A method of fracturing a subterranean formation comprising the steps of:

injecting a fracturing fluid into the subterranean formation such that a fracture is created or extended in a region of the formation surrounding a well bore and generates pressure signals;

sensing the pressure signals;

generating frequency signals corresponding to the pressure signals by applying a wavelet transform to the pressure signals; and

determining from the frequency signals whether the fracture is continuing to extend into the formation.

61. The method of claim 60 wherein the step of determining whether the fracture is continuing to extend into the formation comprises distinguishing between a formation event and spurious data.

62. The method of claim 60 wherein the step of determining whether the fracture is continuing to extend into the formation comprises distinguishing between the cessation of propagation of the fracture, and fracture closure.

63. The method of claim 60 further comprising the step of performing a remediative step after determining that the fracture is not continuing to extend.

64. The method of claim 60 wherein all steps are performed in real time.

65. The method of claim 60 wherein the step of generating frequency signals corresponding to the pressure signals by applying a Wavelet Transform to the pressure signals comprises applying a wavelet from the Daubechies family of wavelets.

66. The method of claim 63 wherein the remediative step is selected from the group consisting of: discontinuing the injection of a fracturing fluid into a well bore; injecting a different fluid into a well bore; pressure pulsing the injection of a fluid into a well bore; injecting a different proppant into a well bore; halting the injection of proppant, and injecting a clear fluid into the well bore, then resuming the injection of proppant into the well bore.

67. The method of claim 63 wherein the step of performing a remediative step after determining that the fracture is not continuing to extend is performed before the fracture closes.

68. The method of claim 60 wherein the step of determining whether the fracture is continuing to extend into the formation further comprises utilizing a log-log plot of a net pressure curve.

69. The method of claim 60 wherein the step of determining whether the fracture is continuing to extend into the formation further comprises utilizing an expert computer program.

70. The method of claim 69 further comprising the step of performing a remediative step after determining that the fracture is not continuing to extend, wherein the remediative step is suggested by the expert computer program.

71. A method of flooding a subterranean formation, comprising the steps of:

injecting a fluid into a region of the subterranean formation surrounding a well bore so as to maintain or increase the pressure in the formation;

creating frequency spectrum data by applying a wavelet transform to physical property data sensed in the subterranean formation during the time in which fluid is injected into the formation; and

determining from the frequency spectrum data at least one parameter relating to the fluid injection.

72. The method of claim 71 wherein the physical property data is selected from the group consisting of pressure data and temperature data.

73. The method of claim 71 wherein the fluid is selected from the group consisting of water and carbon dioxide.

74. The method of claim 73 wherein the step of determining at least one parameter comprises making a determination selected from the group consisting of: determining that the fluid injection is proceeding effectively; determining that a spurious event has occurred; determining that a formation event has occurred; determining the type of formation event that has occurred; determining whether a remediative step is necessary; and determining whether a remediative step that has been performed was successful.

75. The method of claim 73 wherein the step of determining at least one parameter comprises determining that a formation event has occurred and determining the type of formation event that has occurred, wherein the step of determining the type of formation event that has occurred comprises the step of making a determination selected from the group consisting of: determining that the fluid has reached a boundary within the formation, and determining that the fluid has departed from the zone of interest within the formation.

76. The method of claim 74 further comprising the additional step of performing a remediative step.

77. The method of claim 76 wherein the remediative step is selected from the group consisting of discontinuing the injection of the fluid into the well bore; injecting a different fluid into the well bore; pressure pulsing the injection of the fluid into the well bore; reducing the injection pressure of the fluid injected into the formation; and altering the viscosity of the fluid injected into the formation.

78. The method of claim 77 wherein all steps are performed in real time.

79. A method of conforming a fluid flow profile in a subterranean formation, comprising the steps of:

injecting a first fluid into a region of the subterranean formation surrounding a well bore so as to alter the flow profile of a second fluid within the formation;

creating frequency spectrum data by applying a wavelet transform to physical property data sensed in the subterranean formation during the time in which fluid is injected into the formation; and

determining from the frequency spectrum data at least one parameter relating to the fluid injection.

80. The method of claim 79 wherein the physical property data is selected from the group consisting of pressure data and temperature data.

81. The method of claim 79 wherein the step of determining at least one parameter comprises making a determination selected from the group consisting of: determining that the fluid injection is proceeding effectively; determining that a spurious event has occurred; determining that a formation event has occurred; determining the type of formation event that has occurred; determining whether a remediative step is necessary; and determining whether a remediative step that has been performed was successful.

82. The method of claim 79 wherein the step of determining at least one parameter comprises determining that a formation event has occurred and determining the type of formation event that has occurred, wherein the step of determining the type of formation event that has occurred comprises the step of making a determination selected from the group consisting of: determining that the fluid has reached a boundary within the formation, and determining that the fluid has departed from the zone of interest within the formation.

83. The method of claim 81 further comprising the additional step of performing a remediative step.

84. The method of claim 83 wherein the remediative step is selected from the group consisting of discontinuing the injection of the fluid into the well bore; injecting a different fluid into the well bore; pressure pulsing the injection of the fluid into the well bore; reducing the injection pressure of the fluid injected into the formation; and altering the viscosity of the fluid injected into the formation.

85. The method of claim 84 wherein all steps are performed in real time.

86. A system for monitoring the injection of fluid into a subterranean formation, comprising:

means for injecting the fluid into the subterranean formation;

sensing means for detecting physical property data created by the fluid injection;

data analysis means for creating frequency spectrum data by performing a wavelet transform on at least a portion of the physical property data; and

transmitting means for transmitting the physical property data from the sensing means to the data analysis means.

87. The system of claim 86 wherein the physical property data is selected from the group consisting of temperature and pressure data.

88. The system of claim 86 wherein the data analysis means further determines from the frequency spectrum data at least one parameter relating to the fluid injection.

89. The system of claim 88 wherein the at least one parameter determined by the data analysis means is selected from the group consisting of: a determination that the fluid injection is proceeding effectively; a determination that a spurious event has occurred; a determination that a formation event has occurred; a determination the type of formation event that has occurred; a determination whether a remediative step is necessary; and a determination whether a remediative step that has been performed was successful.

90. A system for monitoring the injection of fluid into a subterranean formation, comprising:

a sensor for detecting physical property data created by the fluid injection;

a data analyzer for creating frequency spectrum data by performing a wavelet transform on at least a portion of the physical property data; and

a transmitter for transmitting the physical property data from the sensor to the data analyzer.